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ABSTRACT

Somewhat as Piaget proposed the existence of formal operations acting on concrete operational structures, Basseches (1978) has proposed the existence of dialectical operations acting on formal operational structures. Basseches gives a qualitative account of dialectical operations via the enumeration of 24 schemata categorized into four groups: Motion-Oriented, Form-Oriented, Relationship-Oriented, and Meta-Formal. Other theories of cognitive development beyond the level of formal operations propose a structural model for some aspect of adult cognitive processing, assuming that there is a common underlying structure that organizes experience and/or overall personality functioning. Whether the structure consists of a way of organizing epistemological assumptions and expectancies (Perry, 1970), a way of structuring moral conflicts (Kohlberg, 1981), a way of orienting personality (Kegan, 1982; Loevinger, 1976), or a way of grouping systems of logico-mathematical cognitive transformations (Piaget, 1970), this assumption involves the prediction of an unseen regulative organization that determines behavioral output (Broughton, 1981). In contrast to these structural models, Pascual-Leone (1983) proposes a process-analytic model viewing ego growth in the context of a set of stages of adult cognitive development which, in turn, he bases in his theory of Constructive Operators. The relationship between Basseche's concept of dialectical operations and Pascual-Leone's concept is not entirely clear. Much additional work remains to be done simply to identify the general features of post-formal thinking. (NRB)

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Psychological Models of the Development of Dialectical Thinking

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Paper presented at the International Conference on Thinking, Cambridge, Massachusetts, August, 1984.

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Psychological Models of the Development of Dialectical Thinking

Recently many researchers have sought to extend Piagetian analysis beyond formal operations. We wish to present a brief account of Basseches' (1978, in press) conceptualization of post-formal thinking as the development of dialectical processing, some comments on the relationship of this conceptualization to other models of cognition in adolescents and young adults, and a description of our own attempts to clarify the nature of the development of dialectical thinking. Prominent in our commentary is a distinction between structural models and the process-analytic model of Pascual-Leone (1983). We begin with a summary of the notion of formal operations.

Formal operations have been described by Inhelder and Piaget (1958) as consisting of the 16 binary propositions and the INRC system that interrelates them as a lattice structure. Formal operations coordinate and integrate the concrete operational abilities described by the nine groupings involving classification and seriation. As an example consider conjunction, (p q), one of the 16 binary propositions, that is, combinations of p and q where, for example, p and q are products of concrete classification or seriation operations. Its Identity function is $(p \cdot q)$, its Negation is $(\bar{p} \vee \bar{q})$, its Reciprocal is $(\bar{p} \cdot \bar{q})$ and its Correlative is $(p \vee q)$. To possess formal operational reasoning, subjects must be able to demonstrate in a task protocol that they can generate the INRC transformations for any of the 16 binary propositions and utilize the necessary interconnections among these.

This structural account of the stage of formal operations was used to explicate the reasoning involved in closed-system tasks, largely like those of high school physics problems. Manipulating these operations, subjects can generate the set of possibilities, separate and control the variables, and by a process of empirical testing of the combinatorial possibilities, arrive at the relationships that hold for a given case.

It is unclear whether Piaget believed that formal operational thinking was the endpoint of cognitive development (Inhelder and Piaget, 1958). It has been said that his account of logical development describes that of a maturing scientist, yet some who have reflected upon the nature of contemporary science find his formulation of propositional logic inadequate for representing scientific developments such as relativity theory (Koplowitz, 1984; Sinnott, 1984) or modal logic (Broughton, 1984), or for conceptualizing scientific revolutions (Basseches, in press). Basseches and others have proposed that formal operations are not the final structural development in cognition.

Dialectical Operations

Somewhat as Piaget proposed the existence of formal operations acting on concrete operational structures, Basseches has proposed the existence of dialectical operations acting on formal operational structures. Basseches gives a qualitative account of dialectical operations via the enumeration of 24 schemata or moves of thought. These moves are vaguely similar to transformative operations in earlier

Piagetian stages, but there are striking differences. Their exact nature is not as well specified. The outcomes are unclear as there is no closed system of possibilities from which they are drawn. Reversibility does not hold, that is, the elements on which a dialectical operation acts can not be restored to their original form either through formal or dialectical operations. The conditions under which the various dialectical operations will apply are not easily specified.

Basseches categorizes his 24 schemata into four groups. The first group is called Motion-Oriented Schemata. They consist largely of moves of thought that seek out and emphasize change in situations and ideas. These moves emphasize transformation over constitutedness, praxis rather than product. An example is "Understanding or Describing Events or Situations as Moments of a Process." This move views change as prior to constituting events, rather than as derivative of atomic, discrete events linked by causal mechanisms.

The second group consists of Form-Oriented Schemata. They emphasize the forming of systematic wholes, the constructing of formal organizations. An example is the "Location of an Element or Phenomena Within the Whole(s) of Which It Is a Part," which emphasizes contextualization and the viewing of an event in the context of a broader whole.

The third group consists of Relationship-Oriented Schemata. These moves are in contrast to thinking that separates and divides analytically without attending to how the separated elements are

fundamentally related. An example is the "Assertion of Internal Relations" which emphasizes that the nature of a conceptualized event is to be found in the relationships of which it is a part and is so constituted by that body of relationships. Although form-oriented schemata emphasize the systematic nature of situations and ideas and thus acknowledge the importance of relationships, relationship-oriented schemata deal more specifically with the nature of the relationships by which systems are constituted.

The fourth group consists of Meta-Formal schemata. These are the schemata which integrate motion-oriented, and relationship-oriented schemata with form-oriented schemata in cognitive operations upon previously constituted systems of propositions. An example is the schemata of "Attention to Problems of Coordinating Systems (Forms) in Relation (to each other)." This involves taking a meta-perspective on formally derived systems of concepts, that is, stepping outside of a single system in order to juxtapose, compare, correlate or coordinate two or more systems.

Basseches (1978) documents the use of the 24 dialectical schemata in a set of individual interviews with 27 subjects. Each of the subjects was either a university freshmen, senior, or faculty member. Basseches asked each participant to discuss seven general questions about education. The interviews were tape-recorded, transcribed and assessed for the presence and relative strengths (clarity) of the schemata. A single rating dependent on both of these qualities was

given for each schemata and summed for each subject. These summed ratings were the basis for a comparison among the three groups. Statistical analyses indicated developmental increases in the usage of dialectical schemata with respect to age and level of post-secondary education.

Dialectical Operations in Context

In order to contextualize Basseches' work on dialectical operations we shall review other models of cognitive development beyond the level of formal operations. Although he did not present his work simply as stages to be added onto formal operations, most researchers point to Perry's (1970) work as the first attempt in the Piagetian tradition to consider factors other than formal operations in the cognitive development of young adults. Working out of the Bureau of Study Counsel at Harvard in the fifties, Perry formulated a series of nine positions of intellectual and ethical development. Perry's positions (he purposefully avoids use of the term stage) describe a movement in an individual's mode of structuring knowledge--from a position of authoritarian dualism to an awareness of the multiplicity of perspectives, and onward to a realization of the relativistic nature of human knowledge and the need for formulating specific commitments as existential choices in one's action processing or praxis.

Lawson (1978) has indicated that there are two aspects to the developmental process that Perry is describing; the one a purely cognitive, intellectual restructuring that attends post-secondary

schooling, and the other an existentially oriented process of identity resolution. She reports that more support has been found for development through the earlier positions, focused on cognitive restructuring, than for the later ones focused on identity resolution. She points to Kitchener (1978) and to King (1977) as examples of researchers who have sought to further investigate the cognitive component and clearly Basseches' work is focused on the cognitive component as well.

Within the cognitive component the most significant aspect of Perry's work is his characterization of the experience of relativism, a characterization which reappears in several of Basseches' Dialectical Schemata. Perry (1970) defines relativism as the realization of, "a plurality of points of view, frames of reference, value systems and contingencies in which the structural properties of contexts and forms allow various sorts of analysis, comparison and evaluation" (glossary). Perry observed that teacher-student relationships become reconceptualized at this time. Students in the earlier positions see their role as being one of receiving the knowledge that is given to them by their instructors who are considered the repository of knowledge. Gradually, they begin to perceive that teachers have their own biases, perspectives, limitations, and so forth and that they differ from the students only in their roles as teachers and in their greater experience with the nature of learning and analysis. Parallel to this, students reconstrue their own roles, first emphasizing "what

to learn," then "what to think" and finally "how to think" (Mentkowski, Moeser, & Strait, 1983). In general, the categorical black-and-white dichotomies of adolescent reasoning are suspended as yo[illegible]s come to appreciate the element of necessary subjectivity in kno[illegible]edge (Sinnott, 1984) and the multiplicity of such subjectivities, each with their own contexts, that orient the parameters with which each construes the same events. This must nevertheless be distinguished from the postulation of a kind of anarchistic subjectivism, because analysis can coordinate the differing frames of reference, analogous to tne coordinations made possible by the Lorentz transformations in relativity theory (Russell, 1925).

More recently, Sinnott (1981, 1984) offers some clarification and elaboration of the nature of relativistic thinking. To evaluate the presence of relativistic thinking in her subjects' analyses of three standard problems she looks for eight specific kinds of thinking processes. The first of the aspects of relativistic thinking is Metatheory shift which refers to an intentional alteration of one's set of a priori assumptions and hence of the types of solutions proposed. Problem definition occurs when subjects are explicit about the way they have formulated the problem to themselves for their own purposes. The formulation might or might not involve a metatheory shift. A process/product shift occurs when the outcome or solution is stated in relation to the processes of reasoning that led to it. Parameter setting is when the subject goes beyond the stated situation and sets parameters or variables that will be used to formulate relationships

whether or not the parameters are altered to arrive at different solutions. Pragmatics occur when the subject selects one of several variant formulations of a problem for practical reasons. Multiple solutions are indicated when the subject explicitly notes that differing processes or a priori assumptions lead to different valid solutions. Multiple causality is asserted when subjects acknowledge that events are multiply determined and that outcomes are the result of numerous interactions. Paradox is noted when the problem is stated as containing apparently conflicting interpretations.

Richards and Commons (1984) also working within the purely cognitive aspect of problem-solving, offer another view of the nature of relativistic thinking. Their work involves an account of metasystematic reasoning which they view as a post-formal ability. As an example of metasystematic reasoning they give Einstein's formalization of the relationship between inertial mass and gravitational mass in relativity theory. While their definition of metasystematic operations involves operations coordinating propositional systems formed by formal operations, they do not view metasystematic operations as so qualitatively different from formal operations as Basseches views dialectical operations to be. They describe the metasystematic operations in terms of such standard qualities as additivity and transitivity. Richards and Commons make no claims that the operations they describe account exhaustively for post-formal abilities. Indeed, their discussion of cognitive acts

considers formal systems as static wholes without any element of motion or transformation of systems. Certainly a comparison of systems can be made without resort to dialectical operations and this seems more likely to occur with the kind of task employed by Richards and Commons than with the kind employed by Basseches. Richards and Commons define the problem for their subjects who solve it by constructing a series of formal relationships. Basseches presents an open-ended situation which requires the subjects themselves to construct the variables, systems, constructs, and so forth. In general the nature of the task should be an important concern in comparisons of conceptualizations of adult cognitive development. For example, only a cursory examination of Piaget's formal operational tasks is necessary for one to realize that they are not well-suited to elicit the types of thinking, such as relativistic thinking, under consideration here.

Koplowitz (1984) is another person concerned with relativistic thinking as an aspect of qualitative differences between formal and post-formal reasoning. His discussion of a g[illegible]al systems stage and a subsequent unitary stage bears some similarity [illegible]sseches' qualitative description of the dialectical stage. Koplowitz describes the general systems stage as succeeding formal operations and having the following features:

1. Causality is viewed as cyclical and multi-factorial rather than unilinear,

2. Variables are viewed as interdependent rather than independent,

3. Boundaries of systems are viewed as open to information and exchange rather than as artificially closed, and

4. The permanent object is viewed as an entity that is conceptually filtered, rather than as a neutral thing-in-itself.

The unitary stage emerges when the constructed nature of the permanent object is realized and reality is experienced as an undifferentiated whole from which we construct viable conceptual systems.

The development described by Koplowitz is an epistemological one and has a spiritual element to it. In addition to citing the examples of quantum mechanics and relativity, where these stages have been identified, Koplowitz cites eastern spiritual traditions as emphasizing the qualities of thinking found in the general systems and unitary stages. Recently there has been interest in comparing eastern spiritual traditions and the world-view of Western physics (Capra, 1977; Zukav, 1979). Similarly, Kohlberg (1981) has proposed a possible seventh stage of spiritual development as the culmination of his cognitive stages of moral development. The proposed dialectical stages in thinking seem to evince many properties of a spiritual attitude towards being-in-the-world whereby one perceives oneself as coming to interact with the "outside" as one comes to know it. Kegan (1982) refers to this development as an interpenetration of self and world. Fowler (1982) characterizes it as becoming more porous or permeable to the world.

Kegan and Fowler as well as others, for example Pascual-Leone (1983, 1984b) and Loevinger (1976), have chosen to consider the emergence of dialectical processes not simply within the formal mode of cognition, but rather within a matrix of maturing ego functions. In particular Kegan (1982) has outlined six stages of ego functioning, each stage consisting of a dialectical reequilibration of previous stages. He likens stage development to a helix structure twisting alternately from a self-orientation to an other-orientation and back again. His penultimate level, the Institutional, is associated with formal operational ability and is characterised by a preoccupation with "independence; self-definition; assumption of authority; exercise of personal enhancement, ambition, or career," (Kegan, 1982, p. 227). The final level, the Interindividual, is characterised by "interdependence, self-surrender, intimacy, and interdependent self-definition" (Kegan, 1982, p. 227) and is viewed as a disentangling or emergence from the constraints of the previous Institutional balance. The Interindividual is a reorientation towards others after the self-orientation of the Institutional stage. Qualities of the final stage are compatible with Basseches' dialectical moves of thought. For example, such schemata as the recognition of the correlativity of self and other, the recognition of ongoing interaction as a source of movement, the avoidance of reification, the understanding of things as moments of a process, and the location of an element in the whole of which it is a part characterize personality changes associated with the

Interindividual stage of Kegan. This commonality suggests the possibility that moves of thought should be considered in the wider context of different, but developing, personality orientations.

Similar to Kegan's Interindividual stage in possession of dialectical qualities are Jane Loevinger's (1976) Autonomous stage and James Fowler's (1982) stage of Conjunctive Faith. All three theorists state their concern as being with the evolution of meaning-making. In particular Fowler's stages outline the fundamental reorientations of one's existential attitude towards life and value. One aspect of dialectical thinking which he describes is the tolerance of contradiction and the surmounting of polarity. Fowler says of stage five that it

> affirms and incorporates existential or logical polarities acting on a felt need to hold them in tension in the interest of truth. It maintains its vision of meaning, coherence and value while being conscious of the fact that it is partial, limited, and contradicted by the visions and claims of others. It is not simply relativist, affirming that one person's faith is as good as another's if equally strongly held. It holds its position with a kind of provisional ultimacy: remembering its inadequacy and open to new truth, but also committed to the absoluteness of the truth which it inadequately comprehends and expresses. (Basseches, in press, p. 189).

Such commitment is similar to Perry's description of a dialectical commitment which both chooses an orientation in life, and yet remains open to changes in that orientation. However, the notion of an underlying, but poorly perceived, absolute truth is foreign to Perry. Although he can envision a person at an advanced level of development committing himself with consideration and courage "to a faith in a religion which includes a faith in an absolute order . . ."; he would consider it a failure of logic (or a regression to an earlier form) if such a person did not continue "to respect the legitimacy of relativistic valuing in others, and also others' faiths in other absolutes . . ." (Perry, 1970, p. 202-203). In contrast, succeeding the stage of Conjunctive Faith, Fowler proposes with little empirical support (Basseches, in press) a final stage of faith development, the stage of Universalizing Faith, which asserts the finality of radical monotheism.

Basseches agrees that advanced level choices are ones made with a deep awareness that they are never final or categorically definite, but criticizes Perry on another point (and perhaps the criticism should also be applied to Fowler)--namely, failure to develop an adequate procedure for differentiating between genuine development and regression to prerelativistic reasoning in commitment. Perry does not see his advanced level students in a state of existential anguish believing that all their choices can be as easily revoked as maintained. Rather, he sees their choices as both springing from and

contributing to a developing sense of identity. This sense of consistency with self and a developing faith in self lend Commitments an air of absolutism, thus making some thoroughness necessary in order to separate them from prerelativistic commitments and from commitments made in a spirit of retreat to a more absolute ground. Basseches indicates that this separation can not be accomplished by reference to identity considerations alone. Rather he feels an analysis of cognitive characteristics is necessary; in particular, an analysis of dialectical thinking--the process which he sees as the extension in the cognitive domain of Perry's relativistic thinking. It is of interest to note that apart from Perry's Harvard sample, researchers have found little evidence of Commitment level functioning in university students (Lawson, 1978). To the extent that such functioning requires a pattern of dialectical thinking which has penetrated the entire matrix of ego functions this result should not be too surprising.

Structural Models and Process-Analytic Models

Most of the theorists discussed in this paper propose a structural model for some aspect of adult cognitive processing; that is, they assume that there is a common underlying structure (subject to equilibration processes) that organizes experience and/or overall personality functioning. Whether the structure consists of a way of organizing epistemological assumptions and expectancies (Perry, 1970), a way of structuring moral conflicts (Kohlberg, 1981), a way of orienting personality (Kegan, 1982; Loevinger, 1976), or a way of

grouping systems of logico-mathematical cognitive transformations (Piaget, 1970), this assumption involves the predication of an unseen regulative organization that determines behavioural output (Broughton, 1981). These theorists see a unity to behavioural functioning which stems from a behind the scenes control and monitoring of discrete performances.

In particular, developmental ego psychologists--drawing upon Piagetian stage theory, Eriksonian psychosocial stages, and psychoanalysis--characterize the ego as a structure that is social in origin, functions as a whole, and is guided by a striving for purpose and meaning. As Loevinger (1976) notes, ego structure "is presented as the 'master-trait' in personality, as the frame that provides more specific traits with their meaning and around which the whole edifice of personality is constructed" (p. 41). The frame or organization as such can not be seen, but must be inferred from a variety of measures collected over a variety of situations. In fact, however, most of the researchers in this field employ a single measure and situation. While they note qualitatively the relationship between their measurements and those of others, each is studying a somewhat different phenomena (moral reasoning, social cognition, identity formation, etc.) and this leads to disparate perspectives on and conjectures about the underlying frame or organization. Basseches (in press), for example, acknowledges the idea of ego structure--he says it is "the way in which an individual defines himself or herself in relation to the environment" (p. 295)--but

restricts his attention to the issue of dialectical operations and their organization. Close interaction among researchers in the area is, of course, vital; but, the emergence of more researchers and research teams working with multiple measures across a wide variety of subjects and situations would be a welcome development.

Of course, structural models of cognitive processing are not the only possibility. For example, Richards and Commons (1984) take a much more empirical approach. Rather than refering to internal cognitive structures they refer only to the structure of the cognitive tasks presented to their subjects. This approach implicitly challenges the assumption that there is an unseen, but investigable, unit such as ego--or at least the assumption that it can be adequately investigated. This empiricist stance dates back to Hume (1888) who questioned the existence of ego or personal identity apart from sense impression.

There are rationalist as well as empiricist challenges to the assumption of an ego structure. One may accept the existence of an organized ego on a phenomenological level; yet, rather than treating it as an opaque and ultimate monolith, attempt to analyze the processes underlying that organization. This is the approach of Pascual-Leone (1983) which he labels process-analytic. For example, Pascual-Leone (1984b), says of the ego in accounting for development,

> There is no ego in the sense of an organismic "faculty" or homunculus. The ego is only a particular collection of schemes that have two unique characteristics; (a) the schemes have a tendency to become conscious in the sense that they tend to control mental attention . . . and the subject may be able to speak about their manifestations and (b) these schemes carry information that deals with the coordination of complex cognition and complex affects . . . . Some part of this collection of ego schemes (activated in context by the situation and by affective goals) is always there (albeit changing from one context to the next) to monitor from "behind the scenes" the show of consciousness. (p. 33)

What is observed on the phenomenological level as a pattern or consistency is seen by Pascual-Leone as a collection of learned schemes coordinating cognition and affect. He sees the ego as a development of the reciprocal interaction of schematic representations of the self, world and others. He suggests (Pascual-Leone, 1984b) that these representations "should be functionally understood as some sort of 'filing cabinet' or 'transfer box' containing so many files (alternative sets of schemes), each geared to a different context, every file context- or situation-specific" (p. 36). The self-, other- and world-representations are coordinated in a

collective, which "is the potentially conscious (or preconscious) affective and cognitive functional representation of a community of persons, defined by the roles they play vis-a-vis each other" (p. 38). A collective could be formulated, for example, as role (context: self, other), where the role includes consideration of one's systems of affects and the context is the situational releaser of the role. The number of interactions in the collective could be of a higher order than the two represented here by "self, other."

Pascual-Leone views ego growth in the context of a set of stages of adult cognitive development (Pascual-Leone, 1983) which, in turn, he bases in his Theory of Constructive Operators (Pascual-Leone & Goodman, 1979). Through the Late Formal Stage (until approximately 25 years) individuals refine, differentiate, and develop cognitive, executive, and affective schemes; but also develop collectives coordinating self-other relationships that are context-specific. Within this stage adults feel that a unified theory or philosophy of human interactions that will span differing situations is possible. With the onset of the Pre-dialectical Stage (which extends approximately from 25 to 35 years), the contradictions between differing contexts are noticed and individuals find themselves in what are called existential dilemmas; that is, they realize that their representations of the world contain inconsistencies due to the contextually-based nature of their self-other role operations and strategies.

Pascual-Leone views the schemes and coordination of schemes described here as software structures which give form to the performance of individuals. It is not simply his view of these structures which make his model process-analytic, but also the consideration which he gives to a set of organismic resources labelled silent operators. These hardware structures are applicable across situations, in contrast to software structures which are always context-specific. Two of the important silent operators are Mental attentional energy and Interrupt, the latter being a central inhibition and disinhibition of specific schematic processing. Pascual-Leone (1984a) has speculated about particular brain locations and processes which can be identified with each of these silent operators.

Pascual-Leone's model of ego development locates a source of invariant stage development in changes in the silent operators due to biological maturation. (If stages are to be invariant, then they must be so due to biological invariants or due to social-historical invariants, the latter seeming unlikely to exist although Levinson, et al. (1978) and Erikson (1963) assert that they do.) Pascual-Leone's model posits a physiological weakening and decay of Mental attentional energy and Interrupt starting at about 35 years of age. Pascual-Leone views this weakening as a primary factor in the onset of the Dialectical Stage. This stage is characterized by dialectical operations which are viewed as a developing means of coping with the

inability to suppress the contradictions (resulting from their base in differing contexts) among intra-self systems.

As with other ego stage models, Pascual-Leone's model describes the optimum. Most individuals fail to achieve the final stages in the schemes of Kegan, Fowler and Loevinger, and the same is true of Pascual-Leone. He recognizes not only successful means of coping with the silent operator decay, that is, dialectical operations, but also unsuccessful ones and indicates a variety of maladaptive and neurotic forms such coping might take (Pascual-Leone, 1983).

Pascual-Leone does not view silent operator decay as the only means by which dialectical operations develop. Salient among life experiences that precipitate optimal ego development are what Karl Jaspers called limit-situations such as the experience of illness, loss, and other suffering. In order to accomodate to these difficulties the individual must actively explore the constraints of the environment and such exploration may promote attention to contradictions among intra-self systems. Whenever this occurs the chance of the formation of dialectical operations as a means of coping would be improved.

Dialectical Operations as Learned Attentional Strategies

The relationship between Basseches' concept of dialectical operations and Pascual-Leone's concept is not entirely clear. Basseches refers to post-formal operational reasoning and Pascual-Leone to intra-psychic dialectical operations upon conflicting ego spheres.

Basseches' description of dialectical thinking considers the subject's operative structures as he or she comes to know the world of objects by successive equilabrations. On the other hand Pascual-Leone's model describes intrasubjective dialectical operations that result from individuals self-consciously reflecting upon their varying constructs or conceptions of the social and interpersonal world. Presumably intellectual changes can precipitate changes within ego development and vice versa. Further analysis and research are necessary to distinguish the two types of dialectical operations and their relationship to one another.

An alternative conceptualization of the dialectical operations described by Basseches is dialectical operations as learned strategies for the direction of attention. In terms of Pascual-Leone's Theory of Constructive Operators this is to say that dialectical operations are produced by certain kinds of executive schemes; that is, by abstract cognitive plans which control attention through the boosting of other schemes relevant to the task at hand and which are activated by a particular affective state or by releasing components in a situation. For example, one could form an executive scheme to decenter or redirect attention from a formal conceptualization so as to contextualize, relate, enlarge, or temporalize a given cognitive act in a dialectical manner. Such a dialectical executive scheme could, for instance, place one set of schemes (or thesis) next to another set (or antithesis) and coordinate the two to arrive at a synthesis.

From this point of view it is unnecessary to predicate dialectical thinking upon Basseches' "organized whole" interpretation. Dialectical executive schemes would contain releasing components that were context-specific, and the mobilization of dialectical strategies and operations would depend upon one's learning experience in a given content area. Thus, the achievement of dialectical reasoning ability would not require a complete cognitive reorganization, but rather the experience of employing dialectical shifts of attention in certain areas. Though some might attain this experience through coping with limit-situations or silent operator decay, it could be facilitated best by educational intervention. The Theory of Constructive Operators allows that with extensive experience coordinating cognitive and affective schemes, dialectical executive schemes could become a part of one's general personality functioning or cognitive style through incorporation into Bias schemes. For a discussion of the use of conceptions of post-formal thinking in university education see Sheese and Radovanovic (1984).

Current Research

Present theory and research are inadequate for determining whether post-formal thinking develops in stages and for determining the origin of any such stages. Much additional work remains to be done simply to identify the general features of post-formal thinking. We have recently begun work in this area ourselves and have chosen to start with a replication and extension of the original Basseches (1978) study. Our

general goal is to become familiar with Basseches' dialectical schemata by examining subjects at a variety of ages with a variety of measures. We are presently interviewing a sample of Ontario upper-level high school honour students, York University graduate students, and York University faculty members. In addition to a one-hour unstructured interview focused on each subject's conception of education, subjects complete a more structured one-hour session designed in part to determine whether they are able to recognize schemata they do not produce in the unstructured situation. Of course, if a schemata is produced in the unstructured session the subject should be able to deal with it effectively in the second session; otherwise, the interpretation of the interview is placed in serious doubt.

The second session involves passages coded as manifesting certain schemata taken from transcripts of participants in Basseches' original study. For each passage a nondialectical version similar in length, content, and verbal sophistication has been formulated. Subjects are presented with a dialectical/ nondialectical pair of passages and asked to paraphrase each, to state and justify a preference for one of the two, and to rate each for four characteristics--sensibleness, comprehensiveness, confusingness, and flexibleness. Finally, in order to insure to the greatest possible extent that subjects attend to the salient differences between the items, they are given a statement in layman's language of the dialectical schemata relevant to the pair, then asked to indicate how they interpret that statement in relation to

the pair, specifically whether they can identify any aspects of the dialectical passage which exemplify the stated characteristic. The entire session is tape-recorded and transcribed.

We feel that the measures used in the second session are more sensitive to the development of dialectical schemata than are unstructured interviews. In addition they will provide a view of the way in which those who have yet to master dialectical schemata assimilate and understand the dialectical formulations. Though we do not feel that we will be in a position soon to answer the questions we have discussed in this paper with regard to post-formal thinking, we do hope that our initial investigations will help us to understand the questions better and to maintain the continuing reorganization we have experienced to date of our view of dialectical thinking.

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